

### **ABSTRACT**

An optical transmitter of an optical-wireless hybrid transmission system according to the invention outputs a first single-mode optical signal (center frequency:  $f_{C1}$ ) to an optical receiver, generates a polarization-coupled optical signal by orthogonal-polarization-coupling a second single-mode optical signal (center frequency:  $f_{C2}$ ) with a third single-mode optical signal (center frequency:  $f_{C3}$ ) so as to give the two waves orthogonal polarization directions and the same optical power, and transmits the generated polarization-coupled optical signal to a base station as an optical carrier signal. The optical receiver couples a modulated optical signal transmitted from the base station with the optical signal output from the optical transmitter, demodulates an electrical signal having intermediate frequencies  $f_{IF1}$  and  $f_{IF2}$  that is obtained by photodetecting a resulting coupled optical signal, and generates transmit-data by filtering a resulting output signal.